

WHAT IS CLAIMED IS:

1. A semiconductor device including a plurality of layers of semiconductor chips having substantially the same outer contour,
5 with an integrated circuit being formed on a principal face of each semiconductor chip, comprising:

a non-conductive layer having a conductive portion provided thereon, and

an internal connection member for internally connecting
10 the integrated circuits formed on the plurality of semiconductor chips via the conductive portion provided on the non-conductive layer,

wherein the conductive portion provided on the non-conductive layer only mediates internal connection between
15 the integrated circuits formed on the plurality of semiconductor chips.

2. The semiconductor device according to claim 1, wherein,

20 the plurality of semiconductor chips comprise a first semiconductor chip and a second semiconductor chip, and

the internal connection member comprises:

a first connection member for connecting the first semiconductor chip to the conductive portion; and

25 a second connection member for connecting the second

semiconductor chip to the conductive portion.

3. The semiconductor device according to claim 2,
wherein,

5 the non-conductive layer has a circuit formed thereon,
and

 the conductive portion comprises a conductive
subportion which is connected to the first connection member and
a conductive subportion which is connected to the second connection
10 member, the conductive subportions being in electrical conduction
by way of the circuit formed on the non-conductive layer.

4. The semiconductor device according to claim 3,
wherein the non-conductive layer includes a circuit formed on each
15 of two principal faces thereof.

5. The semiconductor device according to claim 2,
wherein the non-conductive layer is layered between the first
semiconductor chip and the second semiconductor chip.

20

6. The semiconductor device according to claim 5,
wherein the first semiconductor chip and the second semiconductor
chip are disposed so that the respective principal faces of the
first and second semiconductor chips having the integrated circuits
25 formed thereon face away from each other, with the non-conductive

layer being interposed between the other principal faces of the first and second semiconductor chips.

7. The semiconductor device according to claim 6,
5 wherein the conductive subportion which is connected to the first connection member is formed on a principal face of the non-conductive layer which is oriented in the same direction as the principal face of the first semiconductor chip on which the integrated circuit is formed.

10

8. The semiconductor device according to claim 1, wherein the non-conductive layer is a mount on which the plurality of semiconductor chips are placed.

15

9. The semiconductor device according to claim 1, wherein the conductive portion is formed by plating, with a conductive material, a portion of the non-conductive layer that lies outside of an outer contour of the plurality of semiconductor chips when the plurality of semiconductor chips and the
20 non-conductive layer are layered in place.

10. The semiconductor device according to claim 9, wherein the conductive material is a metal.

25

11. The semiconductor device according to claim 9,

wherein the portion of the non-conductive layer that lies outside of the outer contour of the plurality of semiconductor chips is a protrusion from the non-conductive layer.

5 12. The semiconductor device according to claim 9, wherein,

the plurality of semiconductor chips and the non-conductive layer are encased in a package,

10 the non-conductive layer further includes a plurality of supporting legs for stabilizing to the package a portion of the non-conductive layer on which the plurality of semiconductor chips are placed, the plurality of supporting legs being connected to one another by a bridge, and

15 the portion of the non-conductive layer that lies outside of the outer contour of the plurality of semiconductor chips forms the bridge.

20 13. The semiconductor device according to claim 1, wherein the conductive portion is composed of a conductive piece embedded in an aperture formed through a portion of the non-conductive layer that lies outside of an outer contour of the plurality of semiconductor chips when the plurality of semiconductor chips and the non-conductive layer are layered in place.

14. The semiconductor device according to claim 5,
wherein,

the first connection member is composed of a conductive
piece embedded in an aperture formed through the first
5 semiconductor chip,

the second connection member is composed of a conductive
piece embedded in an aperture formed through the second
semiconductor chip,

the first connection member and the second connection
10 member are formed in positions which coincide when the first
semiconductor chip and the second semiconductor chip are layered
in place, and

the conductive portion comprises conductive pieces
embedded in apertures formed through portions of the non-conductive
15 layer that come in contact with the first connection member and
the second connection member, respectively, when the first
semiconductor chip and the second semiconductor chip are layered
in place.

20 15. The semiconductor device according to claim 13 or
14, wherein the conductive pieces comprised by the conductive
portion are metal pieces.

16. The semiconductor device according to claim 14,
25 wherein the conductive piece composing the first connection member

is a metal piece.

17. The semiconductor device according to claim 5,
wherein,

5 the first connection member is composed of a conductive
piece embedded in an aperture formed through the first
semiconductor chip,

 the second connection member is composed of a conductive
piece embedded in an aperture formed through the second
10 semiconductor chip, and

 the conductive portion comprises:

 a conductive subportion composed of a conductive
piece embedded in an aperture formed through a portion of the
non-conductive layer that comes in contact with the first
15 connection member when the first semiconductor chip and the second
semiconductor chip are layered in place, and

 a circuit for electrically connecting the conductive
subportion to a portion of the non-conductive layer that comes
in contact with the second connection member when the first
20 semiconductor chip and the second semiconductor chip are layered
in place.

18. The semiconductor device according to claim 2,
wherein the first semiconductor chip is disposed so that a principal
25 face of the first semiconductor chip not bearing the integrated

circuit opposes one of principal faces of the non-conductive layer,
and

the second semiconductor chip is disposed so that a
principal face of the second semiconductor chip having the
5 integrated circuit formed thereon opposes the other principal face
of the non-conductive layer.

19. The semiconductor device according to claim 18,
wherein the second connection member is a metal bump provided on
10 the second semiconductor chip,

the conductive portion including:

a conductive subportion embedded in an aperture
formed through a portion of the non-conductive layer that comes
in contact with the bump when the second semiconductor chip and
15 the non-conductive layer are layered in place, and

a circuit, formed on the principal face of the
non-conductive layer opposed by the first semiconductor chip, for
electrically connecting the conductive subportion to the first
connection member.

20

20. The semiconductor device according to claim 2,
wherein,

the second semiconductor chip is disposed so that a
principal face of the second semiconductor chip not bearing the
25 integrated circuit contacts a principal face of the non-conductive

layer,

the semiconductor device further comprising:

a spacer having an outer contour which is smaller than an outer contour of the first semiconductor chip and the second semiconductor chip, the spacer being disposed on the principal face of the second semiconductor chip having the integrated circuit formed thereon, and

the first semiconductor chip is disposed so that a principal face of the first semiconductor chip not bearing the integrated circuit contacts an upper face of the spacer.

21. A semiconductor device including a plurality of layers of semiconductor chips having substantially the same outer contour, with an integrated circuit being formed on a principal face of each semiconductor chip, comprising:

a non-conductive layer having a first conductive portion and a second conductive portion provided thereon, and

an internal connection member for internally connecting the integrated circuits formed on the plurality of semiconductor chips via the first conductive portion provided on the non-conductive layer,

wherein the second conductive portion provided on the non-conductive layer is a terminal for connecting the integrated circuits formed on the plurality of semiconductor chips to an external circuit.